



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/620,346

07/17/2003

Hiroshi Sumi

Q76616

8680

65565 7590 09/25/2007
SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER

LAM, CATHY FONG FONG

ART UNIT

PAPER NUMBER

1775

MAIL DATE

DELIVERY MODE

09/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/620,346	Applicant(s) SUMI ET AL.	
	Examiner Cathy Lam	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10 and 15 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 28, 2007 has been entered.

Claim Rejections - 35 USC § 112

2. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is vague and indefinite as to what "an inorganic material" is referring to? Is this inorganic material referring to the SiO₂ particles and the ceramic particles in claim 1? Clarification is required.

Claim Rejections - 35 USC § 102/103

3. Claims 1, 2, 4, 6-10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kang et al (US 5296189).

Kang discloses a conductive composition comprised of copper particles and alumina particles. The conductive composition is formed into a conductive paste which is screen-printed onto a ceramic substrate to form a printed circuit board. The conductive paste may be filled into via holes of the ceramic substrate or printed onto the surface of the ceramic substrate (col 6 L 40-43 & L 54-56).

The conductive composition that comprised of copper particles having initial particles size of 2 to 5 μm and the alumina particles of 0.05 to 0.1 μm (or 50-100 nm) in average (col 5 L 43-45 & L 68-col 6 L 1). Kang further teaches that other inorganic materials such as titania (or TiO_2) and silica (or SiO_2) are feasible and have the same function as alumina (Al_2O_3) particles (col 4 L 34-35). The amount of alumina particles is 0.5 to 2 wt% (col 4 L 40-41).

The conductive composition further comprises of an organic vehicle and/or binder (col 9 L 39-40).

The prior art is silent about the resistivity of the conductive layer, the examiner is taking the position that since Kang's conductive paste meets the claimed composition, inherently Kang's copper paste possesses the same resistivity.

The examiner is taking the position that Kang teaches claims 6, 8-9, since average size of the alumina particles is 0.05 μm , i.e. < 2 μm . Kang further teaches that such small size alumina particles is for a more homogeneous mixture with the copper power and to reduce interparticle porosities (col 6 L 1-12). This implies that the inorganic particles are evenly dispersed with the copper particles and formed a homogeneous conductive layer (col 4 L 57-61).

Regarding to claim 7, Kang teaches a multilayer printed circuit board, and the conductive paste that is formed in the via holes and between the ceramic substrates, the examiner is taking the position that the conductive paste is subjected to a plating treatment (col 6 L 51-56).

Kang teaches the present invention but does not specifically teach having both SiO₂ and ceramic particles, however in view of column 4 lines 30-35, it clearly shows that TiO₂ and SiO₂ have the same function as Al₂O₃, thus choosing two of more of these sintering retardant materials is conventional in the art.

Claim Rejections - 35 USC § 103

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al (US 5296189).

Kang discloses the ceramic substrate that is formed of crystallizable glass particles that are densified to from a green sheet (col 7 L 8-13).

The crystallizable glass particles can include lithium disilicate and/or eucryptite, both of which containing lithium and in the form of an alkali metal oxide (col 9 L 3-20).

Kang is silent about the mol% of the alkali metal oxide in the green sheet. In view of Kang's teaching, one skill in the art would choose a workable amount because it only involves routine experimentation.

Response to Arguments

5. Applicant's arguments filed on June 04, 2007 have been fully considered but they are not persuasive. Applicant traverse the art rejection and raises the following issue:

A. The average particle of SiO₂ is not less than 50 nm, such thereby not disclosed by Kang.

In respond to the above issue:

A. Applicant in the specification (page 7 line 19) does not restrict the SiO₂ to be less than 50nm, it only says "preferably 50 nm or less". Even (assuming) the SiO₂ is < 50


Art Unit: 1775

nm is necessary, applicant is required to provide evident or data (if any) showing that using the present claimed SiO₂ size over Kang's ceramic particles' size would give a *noticeable difference* to the whole structure. Meanwhile, the examiner is sustaining the art rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Cathy Lam
Primary Examiner
Art Unit 1775

cfl
September 13, 2007